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POSTER PRESENTATION

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Epicardial fat volume is associated with coronary endothelium-dependent vasomotor response in healthy subjects

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Introduction

Epicardial fat (E_{fat}) is an active ectopic fat depot, directly surrounding coronary arteries, and secreting high level of inflammatory adipokines; its development has been associated with coronary atherosclerosis. We investigated the relationship between E_{fat} and endothelium dependent vasoreactivity of the coronary microcirculation.

Methods

Myocardial blood flow (MBF) was determined by measuring coronary sinus flow with velocity-encoded cine magnetic resonance imaging at 3 teslas. We measured MBF at baseline and in response to sympathetic stimulation by cold pressor testing (CPT) in 17 healthy volunteers with normal left ventricular function (age 24 ± 6 years, BMI = 21.1 ± 2.6 kg/m²). E_{fat} volume was volumetrically assessed by manual delineation on short-axis views. CPT was applied by immersing one foot in ice water for 4 minutes.

Results

A significant increase in MBF was observed: 1.18 ± 0.58 vs 0.84 ± 0.47 mL.min⁻¹.g⁻¹, CPT vs rest, $p=0.002$. Mean relative MBF increase (Δ MBF) was $50 \pm 47\%$. Mean E_{fat} volume was 82 ± 31 mL and varied from 43 to 131 mL; mean LV mass and Left ventricular ejection fraction were 104 ± 31 g and $64 \pm 5\%$, respectively. CPT significantly increased heart rate (HR) by $28 \pm 13\%$, systolic blood pressure (BP) by $17 \pm 13\%$, diastolic BP by $23 \pm 19\%$ and rate-pressure

product by $52 \pm 25\%$, $p < 0.01$, indicating an increase in myocardial work load. The increase in HR, reflecting sympathetic stimulation, was not influenced by sex, age or E_{fat} volume. CPT induced a decrease in coronary vascular resistance (150 ± 93 vs 114 ± 44 mmHg.mL⁻¹.min.g) by trend ($p=0.08$). Interestingly, we found a significant negative correlation between E_{fat} volume and Δ MBF ($r=-0.51$, $p=0.03$), which remained significant after adjusting for age and sex. Δ MBF was not associated with waist circumference, BMI, CRP, lipid or glycemic parameters.

Conclusion

The increase in E_{fat} is associated with a decrease in endothelium dependent vasoreactivity response, suggesting that E_{fat} could early influence endothelial function.

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